

# The influence of environmental campaign on public awareness in maintaining the cleanliness and waste reduction program: a case study of Bandung City

Bimastyaji Surya Ramadan<sup>a</sup>, Firdha Cahya Alam<sup>a</sup>, Benno Rahardyan<sup>a\*</sup>

<sup>a</sup>Faculty of Civil and Environmental Engineering, Bandung Institute of Technology, Jalan Ganesha 10 Bandung 40132, Indonesia

## Abstract

This paper describes the relationship between the environmental campaign and people awareness, especially Bandung citizens to maintain the cleanliness of the environment and do the waste reduction program. Various attempts were made by local governments in Indonesia to build public awareness in creating a green and clean city, including supporting social movements and community participation for doing the environmental program. We can find many environmental volunteers in Bandung that trying to create environmental awareness. A social movement has been made some massive campaign on environmental programs through the mass media and various activities which indirectly have a positive effect on public awareness and waste management system. The objective of this study was to analyse the perception and public response to the environmental education campaign and how are the effective strategies for implementing the campaign together with all of the stakeholders to be able to walk properly and sustained. This study was conducted using descriptive and inferential analysis based on a literature study, field observations and in-depth interviews with community leaders and the government. The result shows that community participation components (knowledge and perception) are contributing significantly to community participation for maintaining cleanliness and reduce waste because of statistical analysis that has a *p-value* of 0.000 at a significance level of 5%. Approximately 26.4% of public participation can be explained by the knowledge and perception of the community in environmental education campaign.

*Keywords:* awareness, cleanliness, environmental campaign, waste reduction

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## 1. Background

Bandung is the capital city of West Java province which has the area in approximately 16,728,650 hectares with more than 2,000,000 of the human population in 2014. Bandung is known as one of the most populated city which has a rapid development in the economic sector. The high number of residents in Bandung led to the emergence of various problems, especially the problem of municipal solid waste. Every day approximately 1,600 m<sup>3</sup> /day garbage transported to final waste processing site, ± 357 tons of garbage in Bandung scattered every day and only ± 200 ton/day that can be recovered through the 3R Concept (Reduce-Reuse- Recycle) by informal sector, scavengers, self-reusing or selling to sellers of junk [1,2]. This waste problem peaked after an accident in TPA Leuwigajah, which is sliding and causing death up to 147 inhabitants. The city that was originally dubbed as the cleanest and most beautiful city in Indonesia then humiliated as a "Bandung, Sea of Trash".

Sarimukti Landfill which replaces Leuwigajah landfill is 45 km away from Bandung City. This landfill already exhausted on its period time and will be closed in next 5 years. Based on the amount of waste generated and the limited capacity of final processing, the need for an integrated effort to reduce the amount of waste which is generated [1].

One effective solution to solve those problems is the implementation of 3R concept based society. 3R concept is making a positive contribution to the reduction of the waste volume dumped in the landfill. Overcome this concept, Indonesian government issued a regulation that specifically regulates the implementation of the 3Rs through the act and various technical regulations. 3R concept has also been applied in many developed countries as part of the management of sustainable waste management. Nevertheless, the implementation of the 3R concept is still at a low level because of the waste problem requires the commitment and participation of all stakeholders [1,3].

Other problems associated with waste management are Bandung citizen low awareness, especially on cleanliness. The lower class society is still littering in the road and river. The waste collector has been provided by the government but is still commonly found trash scattered. The community can improve the quality of life and prevent the behaviour of littering as well as the pro-environmental

\*Corresponding author. Tel : +62 22 250 4952 Fax : +62 22 251 6586  
E-mail address: [benno@ftsl.itb.ac.id](mailto:benno@ftsl.itb.ac.id)  
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action can influence others to take responsibility in maintaining the environment. Cleanliness is an integral part of perception, understanding and knowledge of shape perception as the basis of a person to participate in a particular activity. Public awareness needs to be improved to increase community participation in an integrated waste management [4,5].

Various programs undertaken by the government, activists, volunteers and other stakeholders in the city to improve public participation embodies Bandung green and clean. Some people who are incorporated in a creative city forum gave initiate to a program called "Cleanaction" which focuses on the garbage and hygiene problems-based society such as public campaigns, neighbourhood exemplary waste-free, action pattern, and giving appreciation to Bandung society that contributes to waste reduction efforts. This program is supported in an integrative manner by the city government, the media, the private sector and volunteer/social entrepreneur.

This paper focuses on how various forms of environmental education campaigns that are summarized in Cleanaction program can influence public awareness of waste management and how to implement the right strategy for Cleanaction program together with all stakeholders in order to be sustainable. So to get a deeper understanding, it requires an analysis of correlation and the relationship between knowledge and public perception of the program on community participation in maintaining the cleanliness and reduces waste at the source.

## 2. Materials and Methods

### 2.1. Overview of Study Area

Bandung selected as the sampling location because Bandung is a city in the province of Indonesia that could potentially generate a high volume of waste. These conditions lead to final processing / landfill very quickly filled when there is no integrated effort to deal with it. This problem has led some communities in Bandung move to campaign for various movements to increase community participation, in particular, to reduce waste and maintain the cleanliness of the city of Bandung.

Bandung is known for a wide variety of initiation of the environmental movement and followed by various cities in Indonesia, for example, "Greeneration" and "Indonesia Berkebun". Both initiatives have emerged as a result of civil unrest on the surrounding environment. Then, followed by emerging social movements of "Bandung Green and Clean" and "Cleanaction" which aim to raise public awareness and maintain cleanliness also reduce waste at the source for Bandung citizens. Currently, the movement has been duplicated in various cities in Indonesia because it is able to make a positive contribution to behavioural change of society.

### 2.2. Overview of Cleanaction Programme

Cleanaction is a program, an initiative of community representation professions (set by 79 Bandung Community) with the collaboration through strategic campaigns and social engineering with the fun way for encouraging society to joint actions to reduce waste from the source. The program is the implementation of the "Love Bandung Clean and Green Movement" Government of Bandung, which signed by all the stakeholders reinforced the town with the Declaration of "Indonesia Clean from Trash 2020" signed by the President with the Head of the Region. Bandung Cleanaction constituted by the Law No. 18 of 2008 concerning waste management; regulation No. 11 of 2005 on amendments to the regulatory regions of Bandung No. 03/2005 on the organization of cleanliness, hygiene and beauty; Local regulation No. 09/2011 on waste management; Bandung mayor instruction No. 2/2013 on the Action Plan Towards Bandung Champion; Collective agreements No. 660.2 /1370-BPLH about "Love Clean and Green Bandung" Movement; and the declaration of Indonesia Clean From Trash 2020 [6].

Cleanaction program has been duplicated in 20 major cities in Indonesia include Padang, Jombang, Bekasi, Bogor, Subang, Palangkaraya, Tangerang, Banjarmasin, Cibinong, Tasikmalaya, Kendari, Makassar, Serang, Wonosobo, Depok, Jakarta, Aceh, Medan and Karawang. In Bandung, Cleanaction program conducted in Car Free Day Dago and Cikapundung Riverspot at certain periods in a sustainable manner. To facilitate the implementation of the program, there is a clustering system that makes volunteers divided into their interest and ease of access.

### 2.3. Materials

In this research, Cleanaction programs are evaluated using a combination of quantitative and qualitative research methods to determine the effectiveness of the program and explore community perceptions of waste management. Subprograms that are evaluated: 1000 Tumbler Movement, Trash Pick Movement/Gerakan Pungut Sampah (GPS), Sorting Trash Movement/Gerakan Pilah Sampah, and Reusable Bag Movement. These four subprograms are considered to represent the goal of social movements Cleanaction which is increasing public awareness to reduce waste and maintain cleanliness.

### 2.4. Methods

Quantitative data were collected using an online questionnaire: personal messages and web-based survey (using Twitter and Facebook) while the qualitative data collected through the study of literature, questionnaires and in-depth interviews with the subject/actors of the social movements. The questionnaire consists of open-ended and closed-ended questions were used to determine the characteristics of respondents, respondent knowledge and perceptions related to Cleanaction as well as participation and willingness of the community to manage waste in

Bandung. The scale used in the question is Likert and modified scale. The study focused on Bandung city which is categorized into three segments based on the work field that is segment 1 (Government), segment 2 (Private and NGO) and segment 3 (Academics) as well as by age 18-24, 25-34, 35- 44 years and 45-54 years. Determination of segments targets based on data Cleanaction activities. The components forming the questionnaire were then coded to facilitate analysis of data using SPSS. In addition, the structure of the questionnaire can be seen in the following Table 1.

Table 1  
Questionnaire Structure

Component	Item/Factor	Code
Socio Characteristics	Age	U
	Domicile	D
	Work	K
Knowledge	1000 Tumbler Movement	P1
	Waste Picking Movement	P2
	Waste Segregation Movement	P3
	Reusable Bag Movement	P4
	Information Source	P5
	Information Distribution	P6
	Frequency	OC
	Another Campaign	AC
Perception	1000 Tumbler Movement	Q1
	Waste Picking Movement	Q2
	Waste Segregation Movement	Q3
	Reusable Bag Movement	Q4
	Environmental Campaign	Q5
	Campaign Media	Q6
Participation	Waste Picking Practices	R1
	Waste Segregation Practices	R2
	Waste Reduction Practices	R3
	Waste Reduction Readiness	R4
	Clean Maintaining Readiness	R5

In order to make the research results can be used to answer the hypotheses and research objectives, it is necessary to use a valid and reliable questionnaire instrument. Testing instrument questionnaire was conducted to 40 initial samples using bivariate Pearson correlation test and Cronbach Alpha coefficient. Once the instrument is declared reliable, the research can be continued in accordance with the target number of respondents who are determined based on the Slovin formula.

$$n = \frac{N}{N \times d^2 + 1} \tag{1}$$

Where n = number of samples; N = total population; d = margin of error = 0.1. Quantitative data were analysed using SPSS 16.0 and Microsoft Excel software. The collected data is still an ordinal data (scale), so it is necessary to transform into interval data using successive interval method. Thereafter, data can be tested using the methods of descriptive and inference. The hypothesis test

was conducted to know about the effect of knowledge and perceptions of social movements using linear regression and correlation of statistical analysis (SPSS).

### 3. Data Analysis

#### 3.1. Sample Distributions

From the calculation using the formula (1), it was obtained a sample number of 99 samples. To improve the accuracy of the research, taken more than 99 samples (334 samples) with a questionnaire return rate of 43.41% or the number of the complete questionnaire is 189 pieces. The sample was divided equally based on the segmentation of work so that a sample size for each category of work can be seen in Figures 1 and 2.

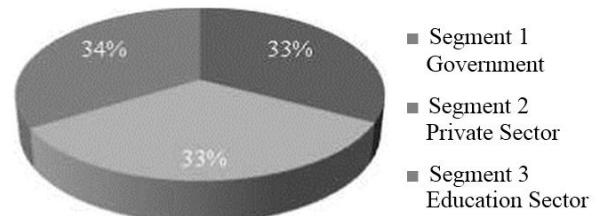


Fig. 1. Comparison of Total Sample Based on Work Field.

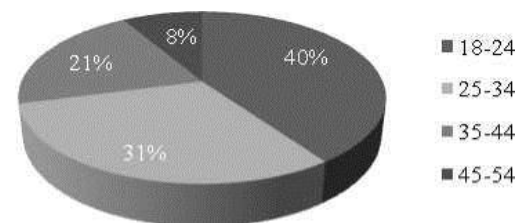


Fig. 2. Comparison of Total Sample Based on Age.

#### 3.2. Data Processing

At the beginning of the survey, the validity and reliability tests were conducted to assure whether questionnaire is able to measure the components that have been determined or not. Factors to be measured have a high correlation to each of its components. In addition, Cronbach's Alpha coefficient has a value of more than 0.5, which means among factors have a strong enough relationship that can be said to be valid and reliable questionnaire instrument.

Knowledge of environmental campaigns varies in each segment of the work field. The government institutions have the better understanding of the social movement of Cleanaction than the other two segments. Information on the 1000 Tumbler Movement is still very poor and not much known to the public even though the distribution of the information is already quite high. The government receives more social campaign information because the

government is the stakeholder that is most closely associated with the Cleanaction programs.

In the perception component, waste sorting considered to be difficult to do by the public. Society is considered to be very understanding about the movement sorting trash as evidenced by the high level of public knowledge of the Waste Segregation Movement. However, the public perception of picking up, sorting and reduce waste is above the positive line, which means the citizens of Bandung city already have a positive perception to maintain cleanliness and reduce garbage at the source.

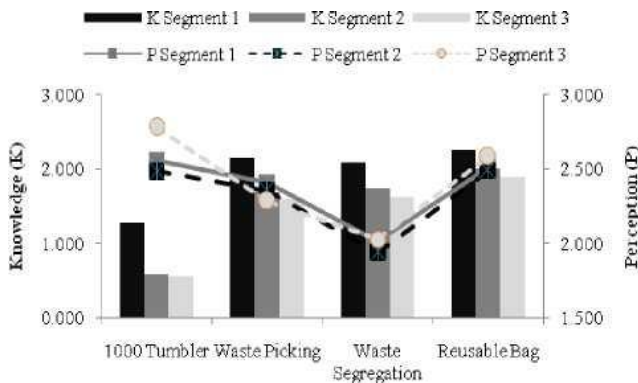


Fig 3. Knowledge and Public Perception of Program Based on the work field.

Bandung city citizens consider environmental campaign highly influential in increasing public participation. Sustainable environment campaign activities will help the process of information dissemination policies issued by the government. The media was also very influential in the campaign activities. The smart city which built by the city government is very effective in disseminating information about government policies and massive movements. It can be seen from the high public perception of movement campaign organized by Cleanaction.

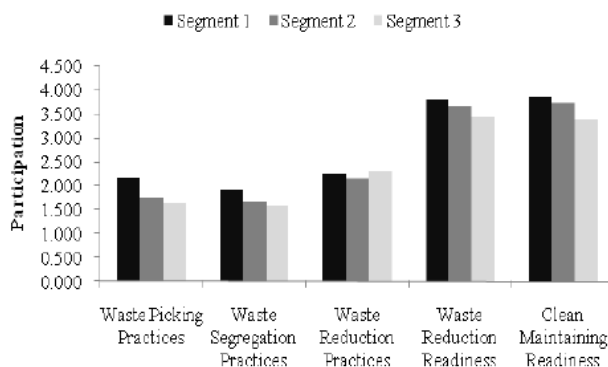


Fig 4. Public Participation to Waste Reduction and Maintain Cleanliness Based on the work field

Information on the Cleanaction program and other environmental campaigns can be accessed from social media, mass media publications both printed and electronic, formal education, discussions and campaigns or

actions in public places. The survey results indicate that social media become the most widely used for gathering Cleanaction information or about 35.9% of the entire media campaign. Campaigns/actions in public places (17.5%) as well as printed media publications such as posters / billboards / banners (20.5%) can be an effective source of information for public to know the environmental programs [7]. Public lectures and discussions were also enough to contribute in improving the knowledge and perceptions related to environmental management. Many forms of socialization of Cleanaction program had a significant impact on the knowledge of citizens.

Although the perception and knowledge of the community to reduce waste at source and maintain the cleanliness of the city of Bandung is already quite high, but participation is still very low. The community is unusual to do the activity of picking and sorting garbage because of the variety of reasons. Society considers the segregation at source is not effective enough to do when waste transported to landfill mixed back into the truck. Participation to reduce the waste is quite high compared with other activities because it is quite easy to do. Citizens are willing to reduce waste and maintain the cleanliness of the Bandung city. This potential should be used well through the efforts and consistent and sustainable activities by stakeholders to empower communities.

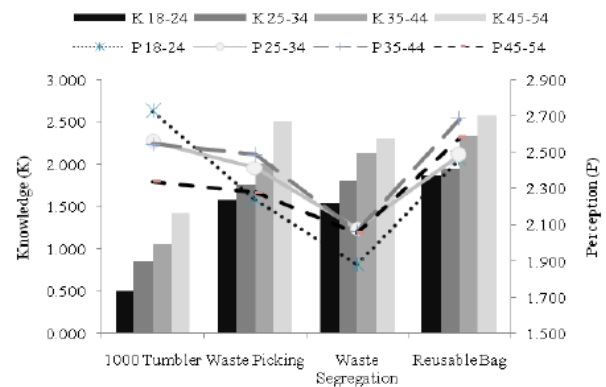


Fig 5. Knowledge and Public Perception of Program Based on Age

Knowledge of the Cleanaction is well understood by the public for the 45-54 age group. The community in that age group is also used to perform a wide range of the movement. With increasing knowledge, then the activities of Cleanaction is assessed to be easy to do. 1000 Tumbler Movement becomes the most easily performed movement, followed by The Reusable Bag Movement and the Waste Picking Movement. The Segregation Waste Movement is considered to be difficult to do. This is in line with the participation component which the habits to reduce waste (use of reusable bag and tumbler) become the most common activities performed by the public.

Correlation and regression analysis is used to determine whether there is a linear relationship between the variables of knowledge, perception, and public participation. The multiple analysis assumes that knowledge as X1 variable,

and perception as X2 variable that gives linear effect to the public participation (Y). Forming components factors are known to be correlated and possess strong linear relationship between the factors, so it is made the sum of the factor for each component. A correlation test was performed at the components to see multiple regression that occurs in each forming component of participation. Correlation test showed that the linear relationship between the components of knowledge and perception is 51.4%. The results of correlation and regression analysis are shown in Table 3 below.

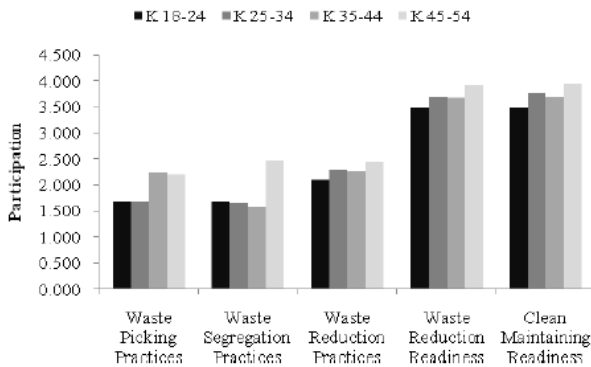


Fig 6. Public Participation to Waste Reduction and Maintain Cleanliness Based on Age

Table 3  
Results of Multiple Regression Analysis

Model	Sig	F		
Regression	0,000	32,325		
Model	B	Std Error	t	Sig
(Constant)	4,616	1,08	4,272	0,000
Knowledge	0,235	0,056	4,188	0,000
Perception	0,407	0,062	6,527	0,000
Model	R	R Square	Adjusted R Square	Std Error Estimate
1	0,514	0,264	0,256	2,653

Multiple regression models that forms indicate significance (sig.) = 0,000 then at a = 0.04 H0 rejected, which means that the model is useful because at least one of the variables/components useful for predicting Y. Fonned estimated regression equation is as follows:

$$y = 4,616 + 0,235x_1 + 0,407x_2 \quad (2)$$

Wherein each increment of public knowledge related to social movements and the programs, the participation of the community will be increased by 0.235 times the original. When the public perception increased by 1 unit, then the participation of the original will increase 0,407 times unit. Statistically, each of the components contributing significantly in the effect of increased the community participation in maintaining the cleanliness and reducing

waste because it has a p-value of 0.000 at a significance level of 5%. Approximately 26.4% of public participation can be explained by the knowledge and participation of the community. This figure is still relatively low, which indicates that there is some additional information beyond the knowledge and perceptions that could be added to improve the accuracy of the model which is established.

4. Discussion

Keeping the Cleanaction program remains sustainable is a challenge for all parties. In addition, it is also important to make this program become more open and inclusive for the community. Cleanaction defined as a program, not an organization or community, for the original purpose of the establishment of this program that everyone feels to have this program and will not get caught up in the egocentric group. The principle of this program is campaigning in a good and positive way and exploiting basic human nature that wants to be appreciated through exemplary action. For example, Waste Picking Movement is done with words and campaign through social media documentation: just "invite your friend to join", and "take the photo and post it on social media". The main used social media, Twitter, is quite effective in providing information and rewards for anyone who posts after do Waste Picking Movement in the region. The main base for the program is Twitter because it is easily accessed, very fast growing news, and more fun to use when compared to Facebook. The focus of the Cleanaction campaign program is to create an exemplary example through actions and communicative campaign by using design and info-graphics.



Fig 7. Cleanaction Public Campaign (Left: Reusable Bag Campaign, Right: Waste Picking Activity)



Fig 8. Poster Campaign (Left: WOO Tumbler Movement, Right: Waste Segregation Movement) [6]

Problems that occur in the Cleanaction program are divided into two: the external and internal factors. The external factor is the character of Bandung citizens which is difficult to be changed directly. There is needed to do a soft and extra patience explanation to change their behaviour and public awareness in maintaining cleanliness and reducing the volume of waste. Internal factor is the consistency of volunteers in maintaining the continuity of the Cleanaction that is quite disturbing. To overcome this problem, appreciation and awards are given to anyone who has volunteered to help the implementation of the Cleanaction program.

One form of municipal solid waste management is the availability of campaign programs, education and continuous assistance to improve the community's role in 3R. Cleanaction program can be used as tools for promoting public participation. It was proved that at least 26.4% of public participation reason to exist is caused by their knowledge and perceptions about Cleanaction program. Environmental education campaigns have a positive impact on people's knowledge on issues of waste management. Indirect action such as social media campaign turned out to have more impact when compared with direct action, such as public campaigns as well as formal forum discussions. This can happen because the majority of social media users get information all day long that when compared with direct action is incidental. Furthermore, to improve the effectiveness of the campaign, there are several strategies that can be applied [3,5,7] :

1. Increased publication of the program through printed media because besides the social media, printed media such as banners, posters and billboards can facilitate the public in understanding the meaning of each sub program of Cleanaction;
2. Strong collaboration between the stakeholders of waste management and building commitment among members of society, especially social leaders in each region. Education campaign, in the beginning, is only used to trigger awareness, then social leaders who play an important role in the formation of public awareness;
3. The function of monitoring and continuous evaluation conducted among actors who implementing Cleanaction program that can increase the quality of education
4. Addition of waste management facilities, along with the socialization and education to the community through creative, fun and attractive activities to the people;
5. Providing incentives/rewards for people who can consistently contribute in the community. For example procurement poster contest for the sanitation promotion of Bandung city, the winning poster can be duplicated and placed in a public space in the city.

## 5. Conclusions

Various efforts made by the community to raise awareness of the Bandung citizens in waste management, especially to reduce waste and maintain cleanliness. Cleanaction program could potentially be an effective educational media. Bandung city people gave value to the Cleanaction program and support the continuity of the program. Lack of knowledge and perception of the Segregating Waste Movement should be a concern. Factors affecting this low value are due to lack of facilities, information dissemination, and public awareness which is still low in the activities of waste sorting. High willingness to reduce waste and maintain the cleanliness should be underlined because of the potential that exists in these communities can be exploited and maximized, depending on how the follow-up will be implemented. Further research could examine more deeply about other factors that may affect people's participation in realizing the city clean and free of garbage or more factors specific to the activities of waste sorting. Besides, we can also measure the effectiveness of implementation of other environmental education programs in their influence on the habits and knowledge of people in the other cities.

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